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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,591	11/06/2001	Paul R. Margiott	C-2451	7404

7590  
Stephen E. Revis  
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01/08/2004

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 01/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/992,591

Applicant(s)

MARGIOTT ET AL.

Examiner

Raymond Alejandro

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 IDS.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statements (IDS) submitted on 11/06/01 and 03/05/03 were considered by the examiner.

### ***Drawings***

2. The drawings were received on 11/06/01. These drawings are accepted.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

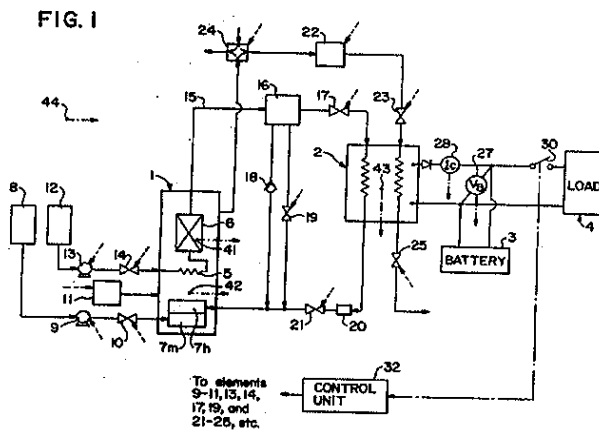
5. Claims 1-17 rejected under 35 U.S.C. 103(a) as being unpatentable over Takechi et al 5154986 in view of Cameron 4537839.

The present application is directed to a procedure for shutting down a fuel cell and fuel processing system.

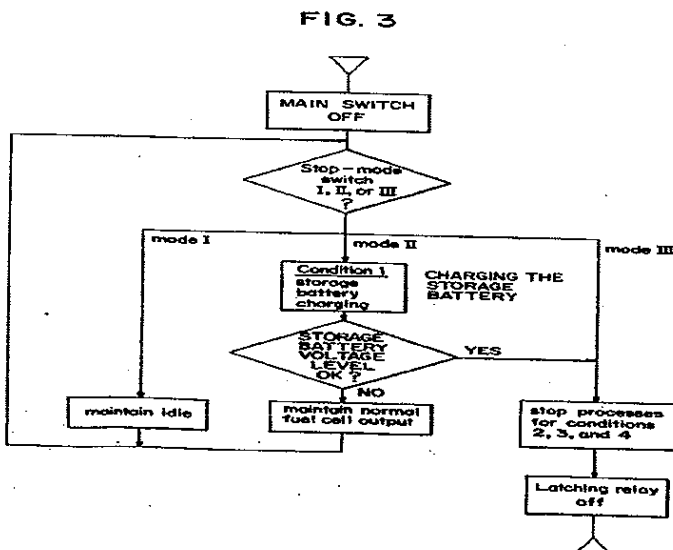
With respect to claims 1 and 15:

Takechi et al disclose shut-off device for fuel cell system wherein in order to achieve a safe shut-down, the fuel cell system must be left in such a state after the cessation of operations that there will be no problem in restarting operations for the fuel cell system (COL 3, lines 59-65). In order for there to be a safe shut-down, the following conditions must be met depending on the type of system to which the control system unit is applied (COL 3, lines 65-68), particularly: condition 3, new air or inert gas beyond certain level must be present in the fuel cell (COL 4, line 3-4), wherein condition 3 indicates that water vapor remains inside the fuel cell. If water vapor remains within the fuel cell in the electrolyte, this water can cause early deterioration of the fuel cell. Safe shut down is accomplished by connecting the four-way valve 2 to the outside air and by using blower 22 to force new air into the cell, or to introduce an inert gas into the cell for a set period of time following the shut-down of the fuel cell (COL 4, lines 26-35). Additionally, instead of eliminating (*water migration is reduced*) the water vapor by performing the above operation for a set period of time, it is also within the scope of the invention to place a water vapor sensor in the fuel cell and use the detection signal from that sensor to halt the purging operation and ensure a safe shut-down (COL 4, lines 35-41). It is also disclosed that cool outside air is introduced to cool down and ensure a safe shut down (COL 4, lines 47-50). It is disclosed that the operation of the fuel cell is halted while turning off the external load through a main switch (COL 1, lines 29-35).

**Figure 1** below illustrates the fuel cell processor 1 for generating hydrogen. Connected in parallel to fuel cell 2 is a storage battery 3. A load 4 is connected to both fuel cell 2 and the battery 3 (COL 2, lines 23-31). A fuel tank 8 storing methanol fuel for the burner 7m where it is burned with the aid of air supplied (COL 2, lines 40-48). 7M and 7H also represent burners (COL 2, lines 37-39).

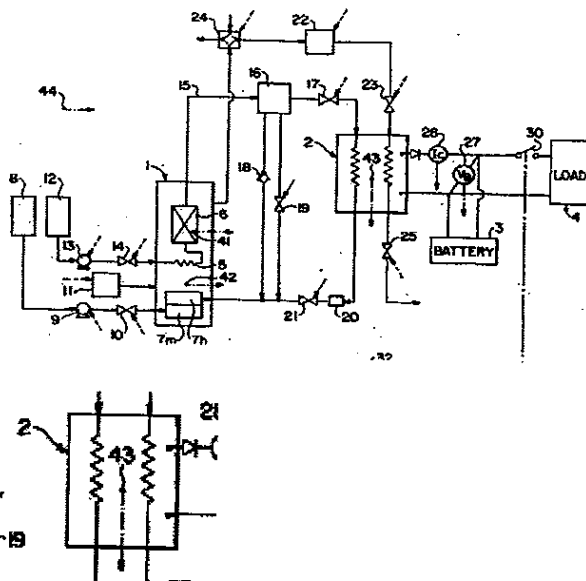


**Figure 3** below depicts the shut-down method for a fuel cell system:



**Figure 1 and its enlarged section** below shows the fuel cell structure. *It is noted that the top and bottom part of feature 2 represents the two fuel cell ends.* It is also disclosed heating

burners 7M and 7H making hot gases (COL 2, lines 35-45). *These burners are in fluid communication with the fuel cell 2.* It is also disclosed that valve 24 is connected thereto, allowing the selection of either low temperature atmospheric air or high temperature air from fuel processor 1 (COL 2, lines 62-67).



Takechi et al is applied, argued and incorporated herein for the reasons above. However, Takechi et al do not expressly disclose the specific purging steps.

Cameron discloses a fuel cell that may be purged with inert gas and/or preheated and/or maintained at an elevated temperature by combusting the hydrogen fuel with air and passing the combusting product gases either through the cell or through a heat exchanger for imparting heat (ABSTRACT). Preferably the combustor includes a catalyst. The hydrogen can either be taken directly from the fuel supply or the waste hydrogen. If the product gases are to be passed into the cell, the stoichiometry of the combustion should be controlled so that hydrogen is absent (ABSTRACT). *Thus, the concentration of hydrogen is below 4 %.*

In light of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to perform the specific purging steps of Cameron in the fuel cell system of Takechi et al because Cameron teaches that his invention provides an inert gas fuel cell purge which is independent of the availability of an external inert gas source; and it provides for the temperature of the fuel cell to be maintained at an uniform temperature. Additionally, Cameron teaches that it has been found that hydrogen fuel may be combusted and the combustion gases passed through the fuel cell to act as the purge. Thus, the combustion product gases are for use either as a fuel cell purge stream or as a heat exchange medium for the fuel cell reactants for heating or maintaining the fuel cell at constant temperature.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro  
Examiner  
Art Unit 1745

